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MUNICIPAL RECYCLING AND HOUSEHOLD CONSERVATION BEHAVIOUR

A STUDY OF GUELPH, ONTARIO

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508G - A STUDY OF GUELPH, ONTARIO

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EXECUTIVE SUMMARY

While attitudes toward resource conservation and other environmental issues have received much attention, few studies have described the nature and extent of environmentally responsible behaviour, and even less attention has been given to the influence of one form of conservation behavior on the adoption of other conservation behaviour. Within the context of a sample of Guelph, Ontario, households, this study aims to: describe the nature and extent of recycling behaviour and selected other forms of conservation behaviour; determine the relationship between degree of involvement in municipal recycling programs and selected other conservation behaviour; and determine the relationship between degree of involvement in recycling and attitudes about the municipal solid waste issue.

Respondents in 161 randomly selected households were interviewed to record recycling behaviour, energy and water conservation behaviour in the home, consumer behaviour, and attitudes about solid waste problems and solutions. 80 of the respondents were participants in Guelph's Blue Box recycling program; 81 were participants in a pilot Wet Dry recycling program requiring households to separate dry recyclable items from wet compostable materials. Indexes of recycling and other conservation behaviour were developed as aggregate measures of behaviour to facilitate analysis of behaviour differences.

Participants in the Blue Box and Wet Dry recycling programs were found to be similar in terms of age, lifestyle, length of residence, and household size; however, their educational profiles were significantly different. Proportionately more Wet Dry respondents were university graduates. Not surprisingly, the level of recycling activity was significantly greater among Wet Dry respondents; environmentally responsible consumer behaviour was also significantly greater among these respondents. When the influence of education was eliminated, consumer behaviour scores remained substantially higher for Wet Dry respondents, though the difference was no longer statistically significant. No differences in energy and water conservation behaviour or in waste management attitudes between Blue Box and Wet Dry respondents were found. Consequently, this study has found only limited support for the hypothesis that participation in municipal recycling programs fosters other forms of household conservation behaviour.

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1.0 INTRODUCTION

Past environmental policies, particularly in waste management, have tended to favour a "hard" path, or reliance on physical technology to solve environmental problems (Seldman, 1980). Bureaucrats have tended not to trust people-oriented technology. Consequently, the social dimension in environmental policy implementation has largely been ignored, even where it is most obvious -- in the implementation of policies and programs aiming to influence the separate decisions of millions of individuals (Stern and Oskamp, 1987).

Increasingly, however, environmental problems are being recognized as essentially human behavioural problems of lifestyle and habits, of ignorance, and of motivation (Cone and Hayes, 1980). To fully address these problems, action is required to halt environmentally destructive activities and strive for a "sustainable" society, one built upon ecologically responsible patterns of behaviour (Lipsey, 1977). The popularity of a conserving lifestyle seems to be on the rise (Leonard-Barton, 1980; De Young, 1985-86), and conservation has long been regarded as the most cost-effective means of dealing with resource scarcity (Stobaugh and Yergin, 1979). The National Task Force on Environment and Economy (1987) recently reminded all Canadians of their major role in making a sustainable society a reality, and urged all Canadian governments to develop conservation strategies to foster sustainability.

Evidently, environmentally responsible behaviour of individuals is now recognized by government as a crucial element in the achievement of sustainable resource policy. The success of current conservation programs, for example, Ontario's municipal curbside waste recycling

program, also known as the "Blue Box" program, is encouraging and may prove educational not only for participants but for policy-makers hoping to build on their success.

There are many elements to the success of conservation programs; economic viability, environmental improvement, and the ability of the program to change human behaviour. This report will focus on the latter, while not refuting the importance of the other factors in the ultimate success of conservation programs. More specifically, this report examines the nature and extent of individual participation in municipal recycling programs, and the effect of participation in these programs on the adoption of other forms of environmentally responsible behaviour.

1.1 Study Aim and Objectives

For successful implementation, conservation programs are dependent on the ability of the policy or program to influence human behaviour (Hogwood, 1984). Yet, very little is known about the behavioural impacts of past and current conservation programs on which to base future programs. Stern and Oskamp (1987) have commented that conservation programs, in particular waste reduction and recycling programs, have been designed without sufficient consideration of the crucial social and behavioural variables that create and reduce problems of waste management. Where environmental policy and behaviour are concerned, there remain many gaps in knowledge. A greater understanding of conservation behaviour should, therefore, be gained before implementing ambitious programs that rely on substantial public participation for successful implementation.

Given that maladaptive human behaviour is at the root of the current ecological crisis, an understanding of environmentally responsible behaviour would be invaluable for both research and application (Stobaugh and Yergin, 1979). Despite the evident theoretical and practical benefits, the study of environmentally responsible behaviour has not received nearly as much attention as has the study of environmental attitudes (Tracy and Oskamp, 1983-84, Stern and Oskamp, 1987). For example, the literature is replete with studies explaining the relationship of various socio-economic characteristics to pro-environmental attitudes (Ostman and Parker, 1987). Many classifications or gradations of environmental attitudes have been developed (McKechnie, 1973; Dunlap and Van Liere, 1978; Kuhn and Jackson, 1989). But the key limitation of relying on the results of attitude studies is that attitudes may not always translate into behaviour (Geller et al., 1982).

In contrast, Tracy and Oskamp (1983-84) observed that very few studies exist that describe the nature and extent of environmentally responsible behaviour. Even less evident in the literature is any attempt to relate the adoption of one form of conservation behaviour to the adoption of others, as a learning cycle.

The overall aim of this research is to contribute to the theoretical and practical applications of conservation behaviour by assessing the behavioural outcomes of individual participation in municipal recycling programs. It is hypothesized that participation in municipal recycling programs affords a form of social learning, allowing individuals to derive knowledge and skill in conservation activities which may predispose them to adopt other forms of conservation behaviour. The more rigorous the involvement in waste separation activities, the more likely individuals are to acquire personal experience and knowledge in waste reduction and

recycling activities, which may lead them to develop positive feelings about environmentally responsible behaviour. These positive attitudes, particularly toward the activity itself, may create or reinforce environmental attitudes, influencing the adoption of other forms of environmentally positive behaviour.

Specifically, the objectives of this study are, in the context of a sample of City of Guelph households, to:

1. describe the nature and extent of recycling behaviour and selected forms of other environmentally responsible behaviour (energy conservation, water conservation and consumer behaviour);

2. determine the relationship between the degree of involvement in municipal recycling programs and: 1) energy conservation; 2) water conservation; and 3) consumer behaviour; and,

3. determine the relationship between the degree of involvement in recycling and perceptions and attitudes about the municipal solid waste problem and solutions to this problem.

2.0 BACKGROUND

2.1 Theoretical and Practical Significance

Current research suggests that environmentally responsible behaviour is a learned response (Sia et al., 1985-86). But how is this behaviour learned and adopted?

The acquisition of environmentally responsible behaviour is contingent on many factors. Scoio-economic characteristics and personal attitudes and values, for example, influence what an individual will understand, accept, and change. Some influences, more specificially identified and discussed in Sia et al. (1985-86), are: 1) knowledge of issues; 2) beliefs concerning issues; 3) individual values; 4) individual attitudes; 5) environmental sensitivity; 6) knowledge of and skill in environmental action strategies; and 7) ecological concepts.

It is difficult to isolate one factor that leads an individual to learn to be environmentally responsible. A factor, however, that seems to be a key element in learning new behaviour is action. In the "social learning approach", action (or practice) and learning are construed as correlative processes, embedded in a learning process that flows from an attempt to change reality through practice (Friedmann, 1987). Social learning "begins and ends with action, that is, purposeful activity, undertaken by an actor, individually or collectively, within the actor's environment" (Friedmann, 1987, p. 183). The principal mode of learning is manifested in a change in practical activity and may also involve so-called change agents who encourage, guide and assist an individual in the process of changing reality. Community-based conservation programs, such as the Blue Box program, which involve individual behaviour change on a day

to day basis, can provide a vehicle for active learning that may play a significant role in learning other similar environmentally responsible behaviour.

Individual participation in conservation has been shown to afford an array of personal satisfactions, including a concern for the future and the desire to act in an environmentally prudent way (De Young and Kaplan, 1985-86). De Young (1986), in his study of recycling behaviour, found that participation is satisfying in its own right and also allows an individual the "opportunity to participate in a community activity, as a way to make a difference in the long run and as a way of taking actions to change the world" (p. 288).

Active participation in conservation activities has many encouraging consequences. Active participation was found by Stern and Gardner (1981) to motivate energy conservation. It also appears to be related to satisfaction where waste recycling is concerned (De Young, 1986). It has been found to derive satisfactions that foster an intrinsic desire to conserve (De Young and Kaplan, 1985-86), and intrinsic motivation is regarded as a more effective and long-lasting modifier of behaviour than extrinsic incentives such as rewards for desirable behaviour or threats for undesirable action (Katzev and Pardini, 1987-88; De Young and Kaplan, 1985-86; Katzev and Johnson, 1984; Dennis and Soderstrom, 1989). Furthermore, active participation in conservation can allow individuals to derive skill in an environmental action strategy, an attribute which has been found to be a stronger predictor of environmentally responsible behaviour than factors such as attitudes and values (Sia et al., 1985-86).

Conservation programs can, therefore, contribute significantly to the acquisition of environmentally responsible behaviour. Behaviour, and its satisfactions, can lead to an intrinsic motivation to conserve. The key to successful achievement of participation in conservation

programs, evidently, is to tap the intrinsic motivation of individuals, which De Young (1986) suggests is relatively widespread, although perhaps latent, in the population. This latent motivational structure closely aligned with environmentally responsible behaviour offers the environmental planner a foundation on which to develop effective conservation strategies. Much remains to be learned about both the environmental and behavioural effects of past and current community-based conservation programs, which have been sadly lacking in comprehensive formative policy evaluation (Stern and Oskamp, 1987). In this regard, waste recycling programs seem to afford a great opportunity for research.

The Blue Box program has been viewed as a successful, educational, conservation strategy (A.M.O., 1989). One can speculate that the program has tapped a widepread latent intrinsic motivation among the public to actively, and individually, address a serious environmental problem -- the waste crisis. As with many public programs, the Blue Box and other municipal recycling programs have prompted exciting, significant, and largely unanswered questions: What is the nature and extent of participation in recycling programs? Have these programs helped to achieve a more environmentally conscious population? Are they a factor in the adoption of other environmentally responsible behaviour?

2.2 Municipal Waste Reduction and Recycling: An Overview

Waste reduction and recycling programs are just a few of many steps on the road to a conserver society. The well known Blue Box program is one such program aimed at eliciting the co-operation of individual householders in the achievement of the reduction of residential municipal waste requiring disposal. Over one million households in Canada are now participating

in the Blue Box program, helping to divert upwards of 15 percent of the residential municipal waste stream from landfill or incineration (R.I.S., 1989).

The Blue Box program emerged, in part, out of the concern for the need to reduce the quantity of waste requiring disposal. The province of Ontario, recognizing the crisis situation, introduced the 4R's: Reduce, Reuse, Recycle and Recover, as part of its Blueprint for Waste Management in Ontario. Waste recycling programs, to be implemented at the municipal level, were viewed, at the time, as a key part of implementing the 4R's in order to promote waste reduction (A.M.O., 1989). However, the Blue Box program, by itself, is not sufficient to meet ambitious waste reduction goals set by the Ontario Ministry of the Environment. New strategies are going to be needed to attain these challenging goals, requiring municipalities to reduce waste requiring disposal by 25 percent by 1992, and 50 percent by the year 2000.

In order to fully and appropriately address the waste problem as a serious environmental and social issue, individuals will have to direct much more attention toward changing everyday habits. Along with a change in habits, it is recognized that individuals must make "a fundamental change in their perception of waste" (L.U.R.A. Group, 1989). Waste reduction and reuse, discrete shopping habits, energy and water conservation, and a general respect for the environment, are some examples of environmental perceptions and behaviour worth striving for in fully addressing environmental responsibility.

The Blue Box program has generated momentum that can and should be built upon when designing more sophisticated and ambitious community-based waste reduction programs (A.M.O., 1989). Some new programs are doing just that. The Wet Dry recycling program, still in its testing phase in Guelph, Ontario, is an example of such a program. It builds on the success

of the Blue Box program, but requires individuals to undertake a more sophisticated form of source separation of waste in the home.

The Wet Dry program involves the separate collection and processing of wet (compostable) and dry (non-compostable; recyclable and non-recyclable) fractions of the residential waste stream. In its pilot form two versions of the program are being tested. In one, Group A, households are required to separate their waste into three streams: a green bin for high quality compostable wet waste such as food and grass clippings; a blue bin for clean recyclable dry waste such as newspapers and plastic film; and a garbage stream for poor quality wet or dry waste, for example, disposable diapers and wax paper. In the other version, Group C, households are expected to separate waste into two streams: a green bin for all wet compostable waste, and a blue bin for everything else except hazardous waste. When fully operational, wet materials will be composted at a municipal composting facility; the finished compost will be used on parks and gardens within the city. The dry materials will be collected and sent to a recovery centre where all possible recyclable items will be extracted and sent to users of these materials. The residue is then destined for landfill or incineration. The Wet Dry system is capable of removing approximately 65 percent of residential and 50 percent of total municipal waste requiring disposal (Gibson, 1991).

The relevance of the Wet Dry program, and others like it, is that is addresses the core of our waste problem -- changing human behaviour. Making the Wet Dry system work in the home involves quite a substantial change in the waste disposal habits of individuals. Waste has to be separated into two (or three) separate streams within the home. The individual is required to distinguish between Wet and Dry materials based on information booklets distributed as part

of the program. The Wet Dry program also emphasizes individual waste reduction as well as recycling.

As the Wet Dry pilot program expands to its ultimate goal of city-wide implementation, apartments, schools, businesses and the entire city will be operating on a source separated waste system of Wet and Dry materials. To make the system work, participation in all areas of life will be required of individuals. The social and behavioural repercussions are obviously quite substantial.

3.0 METHODOLOGY

3.1 Study Area and Approach

The City of Guelph's pioneering efforts in waste management afford an unique opportunity to study the influence of several levels of recycling activity. The well established Blue Box program, as well as the innovative Wet Dry pilot program, provide a basis for comparing recycling activity. A single study community minimizes, as much as possible, other motivating influences, such as public information (for example, municipal recycling newsletters) and the effects of the media (local newspaper coverage, television ads, etc). As well, one study area allows relatively equal access to opportunities for the use of local outlets such as the city recycling depot and environmentally "friendly" retail outlets.

The research approach adopted was to elicit information from participants in the Blue Box and Wet Dry recycling programs through an interview-administered questionnaire.

3.2 Sample Frame and Respondent Selection

The study was confined to households in single family dwellings, in order to maintain as much consistency as possible in opportunities for involvement in household conservation behaviour. Curbside Blue Box service has been available to all single family residences in Guelph for over three years. Households in four selected neighbourhoods were randomly sampled. Neighbourhoods were chosen to reflect a range of socio-economic conditions. The Wet Dry recycling program has been available on a pilot basis for over one year to households in only one area of the city. Households in this pilot area were also randomly sampled.

Sampled households were visited on as many as three occasions to establish contact with an adult respondent, before a substitution was made. In most cases, an adjacent residence served as the substitute. Only several contacted individuals declined to be involved in the study; ultimately, respondents in 161 households were interviewed. 80 were participants in the Blue Box program and 81 were participants in the Wet Dry program.

3.3 Data Collection

There are several advantages to the personal interview over mail back and telephone surveys. A better rapport is established with interviewees. A greater response rate is achieved, and better quality information is obtained (Sheskin, 1985). Because of the individual and complex nature of the behaviour under investigation, the personal interview was deemed to be most appropriate for data collection in this study.

Questionnaires were designed to obtain data necessary to satisfy the study objectives. The questionnaire administered to participants in the Wet Dry recycling program is attached to this report as Appendix A. A very slightly modified questionnaire, reflecting differences in the nature of the recycling involved, was administered to participants in the Blue Box program.

The first study objective was to describe the nature and extent of participation in Guelph's recycling programs and selected forms of other household conservation behaviour (energy conservation, water conservation, and consumer behaviour). The second objective was to determine the relationship between recycling and these other forms of conservation behaviour. Part 1 of the questionnaire was directed to these ends. Respondents were questioned on the frequency of selected conservation behaviour and the length of time such behaviour had been

practiced (to facilitate a comparison of pre- and post-recycling conservation behaviour). A key feature of the questionnaire was the effort to identify how households disposed of 17 selected waste items (Question 8). Included were waste items, such as aerosol cans and magazines, thought to pose problems for some households in determining appropriate disposal.

The third study objective was to determine the relationship between the degree of involvement in recycling and perceptions and attitudes about the municipal solid waste problem. Part 2 of the questionnaire elicited the opinions of respondents on various aspects of the waste problem and solutions to it. An important component was respondent agreement-disagreement with a series of Likert attitude statements (Question 16).

To facilitate controlling other factors potentially influencing household conservation behaviour, while exploring the relationship between recylcing and other behaviour, data were sought on selected characteristics of households, for example, household size, length of residence in the community, and age and education of respondents. Part 3 of the questionnaire was directed to this end.

3.4 Data Analysis

To provide an aggregate description of household recycling and other conservation activities, and to facilitate analysis of the relationship between these behaviours, indexes were constructed for each form of conservation behaviour. Appendix B details the scoring schemes used to construct these indexes. For energy and water conservation and consumer behaviour, responses to questions on specific behaviour (Appendix A, Part 1) were scored and weighted to recognize variations in commitment of time and capital to particular conservation activities and

devices. The weighted scores ranged from zero to 18, 14, and 20, respectively, for energy conservation, water conservation, and consumer behaviour.

Indexes for Blue Box and two variations of Wet Dry recycling were constructed from responses to Question 8 (Appendix A), detailing how households disposed of selected waste items. Points were awarded for appropriate disposal, for example, vegetable peelings to the green bin (Wet Dry participants) or a backyard composter (Blue Box participants). Points were also deduced for inappropriate disposal, for example, paint cans in the blue bin or Blue Box. The theoretical range of recycling scores was -16 to 68 and -23 to 68, respectively, for Blue Box and Wet Dry participants.

Differences among Blue Box and Wet Dry respondent groups, in terms of household characteristics, conservation behaviour, and attitudes about the waste problem, were evaluated by t-test and chi-square analysis.

4.0 FINDINGS

4.1 Social Characteristics of Study Respondents

A major objective of the study was to explore the influence of recycling behaviour, specifically participation in two recycling programs, on other household conservation behaviour. Thus, it was important to examine the social characteristics of recyclers, as these may influence conservation behaviour. Tables 4.1 to 4.4 summarize data on selected social characteristics of respondents and present the results of tests of difference between Blue Box and Wet Dry recyclers.

It was thought that increasing age might bring about a greater sense of environmental stewardship and possibly more time to devote to conservation activities. Table 4.1 reveals that although the Wet Dry recycling group appears to have a higher percentage in the 41 to 60 year old age category, no statistically significant difference in age exists between Wet Dry and Blue Box respondents. Similarly, no significant differences between Blue Box and Wet Dry respondents in most other characteristics were found.

Lifestyle (Table 4.2) attempts to more directly reflect the amount of time adults in the household may be able to devote to recycling and other conservation activities, for instance source separation of wastes. To a lesser extent, it also serves as a measure of the economic resources available, for example for energy or water conservation devices. Profiles of Blue Box and Wet Dry respondents in terms of this attribute are virtually identical.

The number of individuals in a household influences of amount of waste generated, and the presence of preschool age children may reduce the amount of time available to adults for

TABLE 4.1

AGE DISTRIBUTION OF RESPONDENTS

Number (and Percent) of Respondents

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
BLUE BOX N=80	16 (9.94%)	25 (15.53%)	21 (13.04%)	18 (11.18%)
WET DRY N=79	11 (6.83%)	16 (9.94%)	35 (21.74%)	19 (11.80%)
TOTAL	27 (16.77%)	41 (25.47%)	56 (34.78%)	37 (22.98%)

CHISQ = 6.423 PROB = 0.093 DF = 3

GROUP 1 = 30 years and under

GROUP 2 = 31 - 40 years

GROUP 3 = 41 - 60 years

GROUP 4 = over 60 years

TABLE 4.2

LIFESTYLE DISTRIBUTION OF RESPONDENTS

Number (and Percent) of Respondents

	GROUP 1	GROUP 2	GROUP 3	GROUP 4
BLUE BOX N=80	36 (22.36%)	26 (16.15%)	4 (2.48%)	14 (8.78%)
WET DRY N=81	37 (22.98%)	27 (16.77%)	2 (1.24%)	15 (9.32%)
TOTAL	73 (45.34%)	53 (32.92%)	6 (3 73%)	29 (18.01%)

CHISQ = 0.728 PROB = 0.867 DF = 3

GROUP 1 = both adults employed outside of home

GROUP 2 = one or both adults not employed outside of home

GROUP 3 = single parents

GROUP 4 = retired persons and others

particular conservation activities. Table 4.3 reveals no significant differences between Blue Box and Wet Dry recyclers in household size or number of children in the household. Table 4.3 also shows that mean length of residence in Guelph, which may influence commitment to addressing the community's waste problem, is not significantly different between the two recycling groups.

One social characteristic examined did distinguish Blue Box and Wet Dry respondents. Table 4.4 shows that a significantly higher proportion of Wet Dry respondents are university graduates. This reflects the City's choice of study area for the Wet Dry pilot recycling program, a neighbourhood near the University of Guelph in which a number of active and retired university faculty and staff reside. As education is potentially a powerful influence on behaviour, this difference between Blue Box and Wet Dry respondents is important, and will have to be reflected in any analysis undertaken to explore the influence of recycling behaviour on other conservation behaviour.

4.2 Household Conservation Behaviour

4.2.1 Recycling Behaviour

Theoretically, recycling scores can range from -16 to 68 for Blue Box participants, and from -23 to 68 for Wet Dry participants. Table 4.5 demonstrates a marked difference in recycling behaviour between between Blue Box and Wet Dry respondents. The mean score of 50 for Wet Dry respondents was almost twice the mean score of 27 for Blue Box respondents. The range of scores for both recycling groups was similar. In intrepreting this marked difference in recycling scores, it should be noted that Blue Box recycling involves curbside collection of only a limited number of waste items (newspapers and metal, glass, and rigid

TABLE 4.3

ADDITIONAL SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS

	BLUE BOX (N=80)		WET DRY (N=81)		
	Mean	SD	Mean	SD	T Value*
Number of Persons in Household	3.43	1.62	3.33	1.46	0.6697
Number of Children in Household	1.08	1.53	0.91	1.20	0.4244
Number of Preschool Children in Household	0.26	0.65	0.20	0.53	0.4902
Number of Years Living in Guelph	23.13	14.38	23.80	17.58	0.7914

* in all cases the variances are unequal so the approximate T Value is quoted

TABLE 4.4

EDUCATIONAL DISTRIBUTION OF RESPONDENTS

	Number (and Percent) of Respondents		
	GROUP 1	GROUP 2	GROUP 3
BLUE BOX N=79	12 (7.59%)	55 (34.81%)	12 (7.53%)
WET DRY N=79	11 (6.96%)	36 (22.78%)	32 (20.26%)
TOTAL	23 (14.56%)	91 (57.59%)	44 (27.85%)

CHISQ = 20.377 PROB = 0.00 DF = 3

GROUP 1 = some elementary or secondary school

GROUP 2 = secondary school or college diploma

GROUP 3 = bachelors or post-graduate university degree

TABLE 4.5

CONSERVATION SCORES FOR WET DRY AND BLUE BOX GROUPS

		Mean Score	SD	Range	T Value
Recycling Score (/68)	BB =	27.20	12.92	-10-64	0.0000*
	WD =	49.64	15.64	-6-68	
Energy Conservation Score (/18)	BB =	8.13	3.67	0-16.0	0.5476
	WD =	7.78	3.51	0-17.5	
Water Conservation Score (/14)	BB =	5.10	2.94	0-12.0	0.6883
	WD =	4.90	3.36	0-14.0	
Consumer Behaviour Score (/20)	BB =	4.04	3.59	0-17.0	0.0401*
	WD =	5.27	3.89	0-16.0	

Blue Box Group = BB (N=80)
Wet Dry Group = WD (N=81)

* significant at 95% confidence level

plastic containers). To obtain a high score, a Blue Box participant would have to make some use of recycling facilities elsewhere, notably Guelph's central recycling depot.

Reflected in Table 4.5 is a generally high degree of commitment among Wet Dry participants in sorting waste items. Some of the waste items selected for study, however, posed problems for a number of respondents. Table 4.6 lists common disposal errors contributing to lower scores for the Wet Dry group. Over a third of respondents incorrectly disposed of light bulbs, aerosol cans and styrofoam; a smaller proportion appropriately disposed of paint cans. More problems were encountered by respondents in the three stream version of the Wet Dry program, where participants used the green and blue bins for high quality wet and dry waste and a garbage stream for low quality waste such as wax paper and disposable diapers.

While a few Blue Box respondents had very high recycling scores, the level of commitment to recycling was generally lower. Table 4.7 indicates waste items commonly disposed of incorrectly, thus contributing to lower recycling scores. Over half of respondents inappropriately disposed of aerosol cans, corrugated cardboard, and egg cartons; fine paper and magazines were also problem items for many respondents. As well, a proportion of Blue Box recyclables are lost to the garbage stream. Some 31 percent of Blue Box respondents reported sometimes, often, or always discarding rigid plastic containers into the garbage; 19, 17, and 6 percent of respondents indicated they at least sometimes discarded metal cans, glass containers, and newspapers, respectively.

A good indicator of the comparative commitment of Blue Box and Wet Dry respondents to recycling is their handling of household hazardous waste items. Proper treatment of these waste items requires participants of both the Blue Box and Wet Dry programs to take these items

TABLE 4.6

WASTE ITEMS CONTRIBUTING TO LOWER RECYCLING SCORES

WET DRY GROUP

Waste Item	Location of Disposal	Frequency of Disposal: Group A (n=42)	Group C (n=39)	Total (n=81)	Percent of Respondents	Preferred Location of Disposal
Paint can	Garbage	9	1	10	12.35	HHW*
Paint can	Blue Bin	1	0	1	1.23	HHW
Light bulb	Garbage	30	4	34	41.94	HHW
Light bulb	Blue Bin	3	6	9	11.11	HHW
Styrofoam	Garbage	27	4	31	38.27	Blue Bin (rinsed)
Styrofoam	Green Bin	0	6	6	7.40	Blue Bin (rinsed)
Aerosol can	Garbage	24	3	27	33.33	HHW
Aerosol can	Blue Bin	2	12	14	17.29	HHW

* HHW = Household Hazardous Waste Depot

TABLE 4.7

WASTE ITEMS CONTRIBUTING TO LOWER RECYCLING SCORES

BLUE BOX GROUP

Waste Item	Location of Disposal	Frequency of Disposal: Blue Box Group (n=80)	Percent of Respondents	Preferred Location of Disposal
Paint	Garbage	17	21.25	HHW*
Aerosol can	Garbage	50	62.50	HHW
Aerosol can	Blue Box	11	13.75	HHW
Fine paper	Garbage	35	43.75	City Recycling Depot
Fine paper	Blue Box	24	30.00	City Recycling Depot
Magazines	Garbage	39	48.75	Reuse
Magazines	Blue Box	30	37.50	Reuse
Corrugated cardboard	Garbage	51	63.75	City Recycling Depot
Corrugated cardboard	Blue Box	13	16.25	City Recycling Depot
Egg carton	Garbage	49	61.25	Reuse by Local Merchants
Egg carton	Blue Box	13	16.25	Reuse by Local Merchants

* HHW = Household Hazardous Waste Depot

to the city's central hazardous waste depot. It is notable that in all cases a higher proportion of Wet Dry respondents made the effort to do so (Tables 4.6 and 4.7).

4.2.2 Other Conservation Behaviour

Other household conservation behaviour measured were energy and water conservation and consumer behaviour. Examples of energy conservation are use of a clothes line, energy efficient light bulbs, and a night set-back thermostat. Water conservation was measured by such actions as turning water on and off to brush teeth, and installation of toilet dams. Examples of consumer behaviour are use of reusable shopping bags, purchase of drinks in returnable bottles, and membership in environmental organizations.

For all respondents, conservation scores were moderate for energy conservation (mean score of 8 out 18), lowest for consumer behaviour (mean score less than 5 out of 20). The mean water conservation score was 5 (out of 14). This distribution of mean scores is not unexpected. Energy conservation has been an issue since the mid 1970s, and many forms of energy conservation offer direct cost savings to households. Water conservation is gaining some momentum in southern Ontario (Kreutzwiser and Feagan, 1989), but is not yet a local issue, no doubt due in part to Guelph's very adequate water supplies. Concern for the environmental implications of consumer products is largely a very recent phenomenon and not yet well developed.

4.2.3 Recycling and Other Household Conservation Behaviour

A primary objective of this study was to explore the relationship between participation in municipal recycling programs and other forms of household conservation behaviour. Table 4.5 reveals that only for consumer behaviour is there a significant difference in mean

conservation scores between participants in the Blue Box and Wet Dry programs. The mean consumer behaviour score for Wet Dry respondents was over 30 percent higher than the score for Blue Box respondents. The implication is that participation in the more demanding Wet Dry program has encouraged many respondents to rethink their purchasing practices.

This finding is somewhat reinforced in Table 4.8, which shows a one-third higher level of recent conservation-minded consumer behaviour among Wet Dry respondents, though this difference is not statistically significant. This table reports household conservation behaviour subsequent to the introduction of the Blue Box and Wet Dry programs, that is, over the previous three years and one year respectively.

The influence of participation in the Wet Dry recycling program on consumer behaviour, however, is clouded by the statistically significant difference in the educational characteristics of the Blue Box and Wet Dry study groups (Section 4.1). Of all attributes examined, only education distinguished the two recycling groups. To address this concern, further analysis was undertaken. Table 4.9, for example, compares the recycling and other conservation scores of Blue Box and Wet Dry respondents, exclusive of those in the highest educational category (those with at least one university degree). While the consumer behaviour score is no longer significantly different, the mean score for Wet Dry respondents remains substantially higher than for Blue Box respondents.

Differences in mean conservation scores between the two recycling groups were also analyzed separately in terms of the educational attribute (Tables 4.10 and 4.11). Importantly, for both the higher and lower educational categories, Wet Dry respondents in each category had

TABLE 4.8

POST RECYCLING CONSERVATION SCORES FOR WET DRY AND BLUE BOX GROUPS

		Mean Score	SD	Range	T Value
Energy Conservation Score (/18)	BB =	1.44	2.20	0-11.0	0.5980
	WD =	0.96	2.14	0-10.0	
Water Conservation Score (/14)	BB =	1.18	2.10	0-10.0	0.8103
	WD =	1.11	2.04	0-9.0	
Consumer Behaviour Score (/20)	BB =	1.55	1.92	0-10.0	0.1638*
	WD =	2.07	2.71	0-14.0	

Blue Box Group = BB (N=80)
Wet Dry Group = WD (N=81)

* variances unequal therefore the approximate T Value is quoted

TABLE 4.9

CONSERVATION SCORES FOR WET DRY AND BLUE BOX GROUPS

EXCLUDING THE HIGHEST EDUCATIONAL CATEGORY

		Mean Score	SD	Range	T Value
Recycling Score (/68)	BB =	27.20	12.92	-10-64	0.0000*
	WD =	47.60	17.00	-6-68	
Energy Conservation Score (/18)	BB =	8.16	3.67	0-16.0	0.3776
	WD =	7.62	3.42	0-17.5	
Water Conservation Score (/14)	BB =	5.09	2.96	0-12.0	0.3393
	WD =	4.59	3.11	0-12.0	
Consumer Behaviour Score (/20)	BB =	3.99	3.58	0-17.0	0.2032
	WD =	4.79	3.78	0-16.0	

Blue Box Group = BB (N=79)
Wet Dry Group = WD (N=62)

* significant at 95% confidence level

TABLE 4.10

CONSERVATION SCORES FOR HIGHER EDUCATION GROUP

		Mean Score	SD	Range	T Value
Recycling Score (/68)	BB =	26.5	12.92	5-53	0.0000*
	WD =	53.0	12.24	14-68	
Energy Conservation Score (/18)	BB =	7.92	4.11	0-12.5	0.8412
	WD =	7.66	3.70	0-15.0	
Water Conservation Score (/14)	BB =	4.70	2.03	0-9.0	0.4914
	WD =	5.45	3.49	0-14.0	
Consumer Behaviour Score (/20)	BB =	3.75	3.11	0-11.0	0.0297*
	WD =	6.78	4.25	0-16.0	

Blue Box Group = BB (N=12)
Wet Dry Group = WD (N=32)

* significant at 95% confidence level

TABLE 4.11

CONSERVATION SCORES FOR LOWER EDUCATION GROUP

		Mean Score	SD	Range	T Value
Recycling Score (/68)	BB =	27.2	12.24	-10-64	0.0000*
	WD =	48.28	17.00	-9-68	
Energy Conservation Score (/18)	BB =	8.21	3.62	0-16.0	0.6655
	WD =	7.91	3.48	0-17.5	
Water Conservation Score (/14)	BB =	5.23	3.06	0-12.0	0.3052
	WD =	4.62	3.25	0-12.0	
Consumer Behaviour Score (/20)	BB =	4.08	3.71	0-17.0	0.6807
	WD =	4.36	3.33	0-15.0	

Blue Box Group = BB (N=67)
Wet Dry Group = WD (N=47)

* significant at 95% confidence level

higher consumer behaviour scores. The difference was statistically significant only for the higher education group (Table 4.10).

In assessing the influence of participation in municipal recycling programs on other forms of household conservation behaviour, an important feature of these programs should be kept in mind. Guelph households can access information on recycling and municipal solid waste management from a variety of sources, including family, friends, television, newspapers, and newsletters and brochures prepared and distributed by the municipality. As part of the pilot Wet Dry program, a substantial effort was expended to inform households about the program and the waste management issue more generally (Gibson, 1991). Two public meetings were held prior to program start-up, and a third meeting at the end of the program's first year. Information was supplied when the green and blue bins were distributed, and several program update letters were subsequently sent to participants. Participants were also asked to contact city staff about program implementation, and many have done so. Largely as a consequent of this effort to inform, a significantly higher proportion of Wet Dry respondents (27 percent compared to 14 percent of Blue Box respondents) reported municipal brochures and newletters as the most frequently used source of information on the waste issue.

4.3 Waste Management Attitudes

A final objective of the study was to explore the relationship between participation in recycling programs and selected waste management attitudes.

Respondents were asked to suggest what percentage of the responsibility for addressing the municipal solid waste problem should be carried by each of the following sectors of society: the federal government; provincial government; municipal government; producers and

distributers of consumer products; and individual households. Of interest was the extent to which respondents felt they were part of both the waste management problem and a solution to this problem. About 22 and 26 percent of Wet Dry and Blue Box respondents, respectively, indicated that individual households should bear at least 30 percent of the responsibility. This difference, however, was not statistically significant.

Respondents were also asked to indicate agreement-disagreement with a series of Likert statements concerning the waste management problem. Table 4.12 summarizes the responses to these questions (see Appendix A, Question 16, for full attitude statements). The majority of respondents expressed concern about the environmental consequences of garbage, and recognized that something of value can be recovered from household waste. Most respondents felt that recycling should be mandatory, with enforcement and fines, though a majority also recognized that Blue Box recycling, even with full participation, would be insufficient to solve Guelph's waste management problem. Fewer than half the respondents viewed recycling as more effective than waste reuse and reduction. Futhermore, over half thought that raising the prices of overpackaged and disposable consumer goods would substantially reduce waste. In contrast, incineration (with energy recovery) and environmentally safe landfill sites were not viewed favourably by most respondents. A large majority agreed that households should dispose of hazardous waste at central depots; only a minority thought that users of hazardous household products should pay for curbside collection and disposal.

Table 4.12 shows some variation between Blue Box and Wet Dry respondents in their agreement-disagreement with these attitude statements. While none of these differences are statistically significant, several comments on the direction of differences are warranted. In their

TABLE 4.12

WASTE MANAGEMENT ATTITUDES OF RESPONDENTS

Abbreviated Attitude Statement		Percent of Respondents DISAGREE	NEITHER AGREE OR DISAGREE	AGREE	CHISQ*
Very little of value can be recovered from household garbage	BB	85	4	11	1.223
	WD	86	8	6	
I often think of environmental consequences of throwing out garbage	BB	2	15	83	1.662
	WD	7	15	78	
Households should dispose of hazardous waste at central depots	BB	20	2	78	3.943
	WD	19	13	68	
Recycling, with enforcement and fines, should be mandatory in Guelph	BB	28	4	68	1.733
	WD	34	9	57	
Incineration, with some energy recovery, is a good municipal waste option	BB	61	24	15	3.142
	WD	45	30	25	
Blue Box recycling is sufficient to solve Guelph's solid waste problem	BB	62	6	32	5.571
	WD	72	13	15	
Additional environmentally safe landfills will solve the waste crisis	BB	67	15	18	0.706
	WD	69	19	12	
Raising prices of overpackaged/disposable goods will substantially reduce waste	BB	40	9	51	0.384
	WD	35	9	56	
Users of hazardous household products should pay for collection/disposal	BB	54	11	35	0.040
	WD	53	11	36	
Recycling is more effective than waste reuse and reduction	BB	27	31	42	2.118
	WD	36	34	30	

Blue Box Group = BB (N=47)
Wet Dry Group = WD (N=80)

* degrees of freedom = 2; critical chisquare = 5.991

responses, Wet Dry respondents displayed less enthusiasm for recycling; certainly, very few saw Blue Box recycling as a sufficient response. This likely stems from the more demanding nature of Wet Dry recycling, particularly where a garbage stream is unavailable, as well as a greater appreciation of the limitations of recycling. Interestingly, a higher proportion of Wet Dry respondents (25 percent compared to 15 percent of Blue Box respondents) viewed incineration as a good municipal waste management option. On other aspects of the waste management problem, there was little to distinguish Blue Box and Wet Dry respondents.

5.0 CONCLUSIONS

Blue Box municipal recycling programs have been widely acknowledged as successful. These programs continue to effect a modest but important reduction in solid waste requiring landfilling or incineration. They conserve increasingly scarce material and energy resources. More aggressive recycling programs, such as the Wet Dry program proposed for full implementation in the City of Guelph, will enhance these benefits.

This report, however, has been concerned with a rather different potential benefit of municipal recycling. In the Introduction, it was hypothesized that participation in municipal recycling programs represents a form of social learning, predisposing individuals to adopt other forms of conservation behaviour and to express environmentally positive attitudes. Differences in waste management attitudes and selected forms of household conservation behaviour, between participants in the basic Blue Box program and more involved Wet Dry program, were expected.

Evidence derived from this study, however, offers only limited confirmation of this benefit. No differences in waste management attitudes or in household energy and water conservation behaviour, between participants in Guelph's Blue Box and Wet Dry recycling programs, were observed. Environmentally responsible consumer behaviour, as measured by such actions as using a reusable shopping bag, purchasing drinks in returnable bottles, and refusing to purchase over-packaged products, was significantly greater among Wet Dry participants. This difference was also evident after the influence of respondents' educational level was eliminated, though it was not statistically significant.

The apparent influence of participation in municipal recycling on conservation-minded consumer behaviour can be readily understood in terms of the nature of these forms of behaviour and the earlier theoretical discussion (Section 2.1). No doubt, participation in the more demanding Wet Dry program has heightened awareness of the waste implications of various consumer products and practices. The more extensive information process connected with the pilot Wet Dry program (Section 4.2) also was likely influential in modifying consumer behaviour. This information effort even involved personal contacts between city staff and many participants.

The findings of this study offer several practical suggestions for the design and implementation of municipal recycling and other conservation programs. While a much higher level of recycling was achieved by participants in the pilot Wet Dry program, compared to the conventional Blue Box program, some waste items were found to be particularly troublesome. For both groups, hazardous waste items such as aerosol cans and paint cans are notable. However, a much higher proportion of Wet Dry participants properly disposed of these and other hazardous items at Guelph's Hazardous Household Waste Depot. Moreover, within the Wet Dry group, participants in the two stream version (without a garbage option) were particularly diligent using this Depot.

It is also notable that after three years of experience with the Blue Box program, a substantial proportion of participants are incorrectly placing magazines and fine paper in the Blue Box. Some of these individuals may be misinformed, others may simply be careless. This does raise, however, the issue of the role of information in municipal recycling and other conservation programs.

It was earlier noted that a distinguishing feature of Guelph's pilot Wet Dry program was the considerable effort made to inform participants about the purpose and functioning of this program. In many cases participants had personal contact with city staff, and all were repeatedly sent program information. No doubt as a consequence, almost twice the proportion of Wet Dry (compared to Blue Box) respondents reported city brochures as their most frequently used source of information on municipal solid waste. While this observation is not offered as justification for an intensive information component to any recycling or conservation program, it does suggest that the design and delivery of program information is important.

Finally, the findings of this study, regarding the relationship between participation in municipal recycling programs and other forms of household conservation behaviour, raise the possibility that only closely related conservation behaviour may be influenced by participation in municipal recycling programs. This issue needs to be explored more thoroughly. A broader relationship may exist, for example, to which data collection and analysis were insensitive. If, however, only closely related behaviour may be positively influenced, this should be recognized in the design of public programs aiming to encourage environmentally responsible behaviour.

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APPENDIX A

Household Conservation Practices

ADDRESS: _____

DATE: _____

GENERAL INTRODUCTION

Part 1

In this first section of the interview, I am interested in gathering information about the extent of recycling and other conservation activities in your household, for example, concerning energy and water use and waste disposal.

A. Energy Conservation

1. a) Please indicate how frequently your household does each of the following energy-saving activities using the following rating scale, and how long your household has been practicing these activities.

NEVER **1** **OCCASIONALLY** **2** **FREQUENTLY** **3**

					Length of Time
1.	Do you use a clothes-line?	1	2	3	_____
2.	Do you use energy efficient light bulbs?	1	2	3	_____
3.	Do you wash most of your clothes in cold water?	1	2	3	_____

b) Please indicate whether or not your household has installed any of the following devices, and the length of time since they were installed.

			Length of Time
1.	Have you installed a night set-back thermostat?	Yes No	_____
2.	Do you turn off your water heater, or lower the temperature, while on vacation?	Yes No	_____
3.	Have you installed an extra insulating blanket on your hot water heater?	Yes No	_____
4.	Have you installed weather stripping around doors and windows?	Yes No	_____

2. Please describe any other energy conservation activities or devices your household uses regularly:

_____
_____
_____
_____
_____

B. Water Conservation

3. a) Please indicate how frequently your household does each of the following water-saving activities using the following rating scale, and how long your household has been practicing these activities.

NEVER 1 **OCCASIONALLY** 2 **FREQUENTLY** 3

			Length of Time
1.	Do you turn off the water while you brush your teeth?	1 2 3	_____
2.	Do you keep a jug of water in the refrigerator instead of running the tap for a cold drink of water?	1 2 3	_____
3.	Do you collect rainwater for household or garden use?	1 2 3	_____

b) Please indicate whether or not your household has installed any of the following water-saving devices and the length of time since they were installed.

			Length of Time
1.	Have you installed a toilet dam or brick in your toilet tank?	Yes No	_____
2.	Have you installed flow restrictors on your faucets and/or showerheads?	Yes No	_____

4. Please describe any other water conservation activities or devices your household uses regularly:

_____
_____
_____
_____
_____
_____
_____

C. Consumer Activities

5. Please indicate how frequently your household does each of the following activities using the following rating scale, and how long your household has been practicing these activities.

NEVER 1	OCCASIONALLY 2	FREQUENTLY 3

					Length of Time
1.	Do you use a re-usable shopping bag?	1	2	3	_____
2.	Do you carry your own mug and/or eating utensils when eating take-out food?	1	2	3	_____
3.	Do you purchase low-phosphate detergents?	1	2	3	_____
4.	Do you write letters to companies praising or condemning environmental practices?	1	2	3	_____
5.	Do you refuse to purchase over-packaged products, even when the product is desirable?	1	2	3	_____
6.	Do you purchase soft drinks in returnable bottles?	1	2	3	_____
7.	Do you belong to an environmental organization?	Yes No			_____

6. Please describe any other activities your household is involved in which you would consider are protective or conserving of the environment.

_____
_____
_____
_____
_____
_____

D. Recycling

7. a) Are you familiar with Guelph's Wet/Dry recycling program?

Yes
No

If No, please go to question 8.

b) How long have you been participating in the Wet/Dry program?

_____ years

c) In your opinion, what are the advantages and disadvantages of the Wet/Dry program?

_____

_____

_____

_____

_____

8. The following page contains a list of many common waste items. By using the rating scale below, please indicate where you place each of these items by choosing one or more of the six categories: Blue Bin, Green Bin, Garbage, Backyard Composter, City Recycling Depot on Gordon St., or other Recycling Service.

Never	Sometimes	Often	Always
1	2	3	4

For example, for the first item, "Newspaper" a possible response could be:

	Blue Bin (DRY)	Green Bin (WET)	Garbage	Backyard Composter	City Depot	Other Service
Newspaper	2	2				

RATING SCALE: NEVER 1 SOMETIMES 2 OFTEN 3 ALWAYS 4

WASTE ITEMS	BLUE BIN (dry)	GREEN BIN (wet)	GARBAGE	BACKYARD COMPOSTER	CITY DEPOT	OTHER SERVICE	NOTES
NEWSPAPERS							
EGG CARTONS							
VEG./FRUIT PEELINGS							
PAINT							
PLASTIC CONTAINERS							
GRASS CLIPPINGS							
MOTOR OIL							
TELEPHONE BOOKS							
CARDBOARD BOXES							
METAL CANS							
LEAVES							
LIGHT BULBS							
GLASS JARS							
STYROFOAM CUPS/ MEAT TRAYS							
TYPING/NOTE PAPER							
MAGAZINES							
AEROSOL CANS							

9. Please describe other waste reduction activities or devices your household uses regularly. Some examples include: cloth coffee filters, reusing paper, and refusing weekly flyers.

_____

_____

_____

_____

10. a) Did you participate in the Blue Box program before the Wet/Dry recycling program began?

Yes
No
N/A

b) If so, how long did you use your Blue Box for recycling?

_____ years

c) In your opinion, what are the advantages and disadvantages of the Blue Box program.

_____

_____

_____

_____

_____

11. a) Did you recylce your waste via the City Recycling Depot on Gordon Street before the Blue Box program began in 1987?

Yes
No
N/A

b) If you answered yes, please indicate the length of time you used the recycling depot:

_____ years

12 a) Do you practice backyard composting?

Yes
No

b) If you answered Yes, please indicate the length of time you have been composting:

_____ years

c) If you answered No, please indicate why you are not composting:

_____

_____

_____

_____

_____

Part 2 Household Attitudes

In this part of the interview I am interested in gathering information about your attitudes toward waste issues and waste management.

13. a) Please indicate which of the following sources you have used to gain information about municipal solid waste issues. Of those you indicated, which is the source of information you use most frequently?

Newspaper	_____
Television	_____
Newsletters/brochures	_____
Friends or family	_____
Other, please specify:	
_____	_____

14. What percentage of the responsibility for addressing the solid waste problem do you think should be carried by each of the following parties? In suggesting a percentage value, please keep in mind that the percentage should total 100.

		% Responsibility
A.	Federal government	_____ %
B.	Producers and distributers of consumer products	_____ %
C.	Municipal government	_____ %
D.	Individual households	_____ %
E.	Provincial government	_____ %
F.	Other, please specify: _____	_____ %

15. The city of Guelph, along with the other municipalities in Ontario, must reduce the amount of waste requiring disposal by 50% by the year 2000. There are a variety of programs and methods that may be used to achieve this goal, for example, expanded recycling programs, municipal composting programs, and strict bylaws on the amount of garbage that may be placed curbside. There are different characteristics of waste management programs and methods, for example, cost to taxpayers, convenience to householders, and minimizing environmental damage. Please indicate which of the following concerns you think should be most important in guiding Guelph's municipal solid waste management program. Please rank your choices in order of importance, for example, indicate a "1" for most important, "2" for second most important and so on.

_____ minimize cost to municipal taxpayers

_____ maximize convenience for the household

_____ minimize environmental damage to the local environment, e.g. local air and water pollution

_____ maximize fairness to households, e.g. the more garbage a household places curbside, the greater the fee charged by the municipality for collection

_____ minimize the contribution to global environmental problems such as global warming and ozone depletion.

_____ maximize ease of understanding for the household

_____ other, please specify _____

16. Please respond to the following statements by using the scale below:

Strongly Disagree	Disagree	Neither Agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

_____ There is very little of value that can be recovered from household garbage.

_____ The waste crisis can only be solved by applying newer and better technological solutions.

_____ I often think of the environmental consequences of throwing out garbage.

_____ Households should be responsible for disposing of paint cans, batteries and other hazardous wastes and containers at central municipal hazardous waste depots.

_____ Recycling for Guelph households should be mandatory, with enforcement and fines, rather than voluntary.

_____ Incineration, or high temperature burning of all waste, with no recycling but some energy recovery is a good option for municipal solid waste management.

_____ The Blue Box program, with full participation by households, would be sufficient to solve Guelph's municipal solid waste problem.

_____ Additional landfill sites that are environmentally safe will solve the municipal waste crisis.

_____ Raising the prices of overpackaged and disposable consumer products would substantially reduce the amount of household waste requiring disposal.

_____ Those who use paints, toxic cleaners and other hazardous products should have to pay a fee for household hazardous waste collection.

_____ Recycling is a more effective solution to the municipal solid waste problem than reusing waste items and purchasing products that are less wasteful.

Part 3 Household Characteristics

In this final part of the interview I would appreciate some descriptive information about your household.

17. How long have you lived in Guelph?

_____ years

18. a) How many people live in your household?

_____ number of people

b) How many children under the age of eighteen live in your household?

_____ children

c) How many of these children are pre-schoolers?

_____ children

19. Please indicate the situation that best describes your household:

A both adults employed outside the home
B one adult employed outside the home; one adult works at home
C both adults work at home
D single parent; work outside the home
E single parent; work at home
F other, please describe:_____
_____

20 Please indicate your age category:

A under 20
B 21 - 30
C 31 - 40
D 41 - 50
E 51 - 60
F over 60

21. Which category best describes your educational background?

A elementary school
B some high school
C completed high school
D some college or university
E college diploma
F undergraduate university degree
G post-graduate university degree
H other, please describe_____

Part 4 Additional Comments

22. If you have any other comments about municipal solid waste management in general, please describe below:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX B

SCORING SCHEMES FOR CONSERVATION BEHAVIOUR

Construction of an index of behaviour is considered the most appropriate method of evaluating individual commitment to each of the categories of conservation behaviour analyzed in this study.

Responses to the questions in the categories of energy and water conservation and consumer behaviour were limited to a Yes/No or Never/Occasionally/Frequently format (Appendix A). The following scoring mechanism for energy conservation, water conservation and consumer behaviour was adopted:

Response	Score
Never/No	0
Occasionally	1
Frequently/Yes	2

A weighting system was applied to recognize, in the final score, individual behaviour which requires considerable commitment of time and/or initial investment of capital. Certain behaviour requires ongoing behaviour change or substantial behaviour modification and should therefore be recognized as requiring a greater degree of commitment than other less demanding activities.

Another factor considered in the designation of weights was the degree to which the activity or device actually saves resources. For example, regularly turning down the thermostat in the home saves considerably more energy than turning down a hot water heater once or twice a year.

By summing the weighted scores of responses to the questions in each behaviour category, a total index score was derived. What follows is a summary of the scoring and weighting system for energy and water conservation and consumer behaviour.

Energy Conservation

Question	Possible Score	Weighting	Max Score	Min Score
A 1	0-1-2	1.5	3	0
A 2	0-1-2	1.0	2	0
A 3	0-1-2	1.0	2	0
B 1	0 - 2	2.0	4	0
B 2	0 - 2	1.0	2	0
B 3	0 - 2	1.5	3	0
B 4	0 - 2	1.0	2	0

TOTAL MAXIMUM SCORE 18
TOTAL MINIMUM SCORE 0

Water Conservation

Question	Possible Score	Weighting	Max Score	Min Score
A 1	0-1-2	1.5	3	0
A 2	0-1-2	1.0	2	0
A 3	0-1-2	1.0	2	0
B 1	0 - 2	1.5	3	0
B 2	0 - 2	2.0	4	0

TOTAL MAXIMUM SCORE 14
TOTAL MINIMUM SCORE 0

Consumer Behaviour

Question	Possible Score	Weighting	Max Score	Min Score
A 1	0-1-2	1.5	3	0
A 2	0-1-2	1.5	3	0
A 3	0-1-2	1.0	2	0
A 4	0-1-2	2.0	4	0
A 5	0-1-2	1.0	2	0
A 6	0-1-2	1.0	2	0
A 7	0 - 2	2.0	4	0

TOTAL MAXIMUM SCORE 20
TOTAL MINIMUM SCORE 0

The measurement of recycling behaviour was achieved by a series of questions in a much different format than those for the other behaviour categories. Respondents in both the Blue Box recycling sample and the Wet/Dry recycling sample were asked to complete a chart listing a variety of common waste items. They were asked to identify the frequency of disposal of each of these items in any combination of five possible categories of disposal methods (Appendix A). Some waste items are recyclable through the conventional Blue Box program, or the Wet Dry program, depending on which group the respondent is in. Others are hazardous waste items, some are compostable waste items, and some are items which can be re-used or potentially recycled through other in-town and out-of-town recycling services (for example, Tri-Tech Recycling in Kitchener for magazines, and the Gordon Street Recycling Depot in Guelph for fine paper and corrugated cardboard.) Many items are those which are considered problem contaminants in the Blue Box program such as magazines (glossy paper), egg cartons, and cardboard.

By assigning a range of scores from -3 to 4 for each of the waste items on the chart, based on the frequency and nature of disposal, an average score for each waste item was determined. The average scores for all waste items were then summed to a total index score. In most cases, the calculation of an average score of recycling involved summing of individual category responses. For example, a respondent who answered for the item grass clippings "sometimes" for the garbage category and "sometimes" for the backyard composter (BYC) category scored a 2 (0 for answering garbage plus 2 for sometimes composting). In some cases, averaging of category responses was necessary. For example, if an individual answered for the

item newspaper "sometimes" use Blue Box, "sometimes" use the City Depot and "sometimes" use the garbage, the score would be 2, rather than a 4 achieved by summation. In this case, the individual was assumed to be recycling only some of the time, not all of the time, as they are generating garbage. They should not score a 4 because this score recognizes an individual who is always recycling the item.

The following presents the recycling charts used in the surveys, and designates the range of scores for items in each chart. Note that the dashed line (--) means not applicable.

Scoring Scheme for Blue Box Recycling

Waste Item	Blue Bin	Garbage	BYC	Depot	Other	Ave. Score
Newspapers	1-4	-1	0	1-4	1-4	-1 to 4
Egg carton	-1	0	1-4	-1	1-4	-1 to 4
Veg. peels	--	0	1-4	--	1-4	0 to 4
Paint	-3	-3	-3	-3	1-4	-3 to 4
Plastic containers	1-4	0	--	1-4	1-4	0 to 4
Grass clippings	--	0	1-4	--	1-4	0 to 4
Motor oil	--	-3	--	1-4	1-4	-3 to 4
Phone books	1-4	0	--	1-4	1-4	0 to 4
Cardboard	-1	0	--	1-4	1-4	-1 to 4
Metal cans	1-4	-1	--	1-4	1-4	-1 to 4
Leaves	--	0	1-4	--	1-4	0 to 4
Light bulbs	-1	0	--	-1	1-4	-1 to 4
Glass jars	1-4	-1	--	1-4	1-4	-1 to 4
Styrofoam	-1	0	--	-1	1-4	-1 to 4
Fine paper	-1	0	--	1-4	1-4	-1 to 4
Magazines	-1	0	--	-1	1-4	-1 to 4
Aerosol can	-1	-1	--	-1	1-4	-1 to 4

If all items are applicable:

Total Maximum Score 68
Total Minimum Score -16

Scoring Scheme for Wet Dry Recycling -- Group C

In Group C, residents are required to separate their waste into two streams: the Green Bin for wet (compostable) waste and the Blue Bin for dry waste (everything else that is not considered hazardous waste -- both recyclable and non-recyclable items). Residents in this group therefore have no "garbage", although this category was left as an option in order to examine understanding of the program.

Waste Item	Blue Bin	Green Bin	Garbage	BYC	Depot	Other	Ave. Score
Newspapers	1-4	-1	-1	--	1-4	1-4	-1 to 4
Egg carton	1-4	-1	-1	--	-1	1-4	-1 to 4
Veg. peels	-1	1-4	-1	1-4	--	1-4	-1 to 4
Paint	-3	-3	-3	--	-3	1-4	-3 to 4
Plastic containers	1-4	-1	-1	--	1-4	1-4	-1 to 4
Grass clippings	-1	1-4	-1	1-4	--	1-4	-1 to 4
Motor oil	-3	-3	-3	--	1-4	1-4	-3 to 4
Phone books	1-4	-1	-1	--	1-4	1-4	-1 to 4
Cardboard	1-4	-1	-1	--	1-4	1-4	-1 to 4
Metal cans	1-4	-1	-1	--	1-4	1-4	-1 to 4
Leaves	-1	1-4	-1	1-4	--	1-4	-1 to 4
Light bulbs	-2	-2	-2	--	-1	1-4	-2 to 4
Glass jars	1-4	-1	-1	--	1-4	1-4	-1 to 4
Styrofoam	1-4	-1	-1	--	--	1-4	-1 to 4
Fine paper	1-4	-1	-1	--	1-4	1-4	-1 to 4
Magazines	1-4	-1	-1	--	--	1-4	-1 to 4
Aerosol can	-2	-2	-2	--	-1	1-4	-2 to 4

If all items are applicable:

TOTAL MAXIMUM SCORE 68
TOTAL MINIMUM SCORE -23

Scoring Scheme for Wet Dry Recycling -- Group A

In group A, residents are required to separate their waste into three streams: the Green Bin for high quality compostable wet waste such as food and yard wastes, the Blue Bin for clean recyclable dry waste such as the conventional Blue Box items (newspaper, glass, metal cans and plastic containers) as well as other recyclable material not collected by the Blue Box program such as cardboard, wood, fine paper, textiles, magazines, film, plastic and boxboard. The third stream is defined as "garbage" and includes all waste that is not high quality wet or recyclable dry waste, or hazardous waste, for example, disposable diapers, soiled food containers, wax paper and other non-recyclable items.

Waste Item	Blue Bin	Green Bin	Garbage	BYC	Depot	Other	Ave. Score
Newspapers	1-4	-1	-1	--	1-4	1-4	-1 to 4
Egg carton	1-4	-1	-1	--	-1	1-4	-1 to 4
Veg. peels	-1	1-4	-1	1-4	--	1-4	-1 to 4
Paint	-3	-3	-3	--	-3	1-4	-3 to 4
Plastic containers	1-4	-1	-1	--	1-4	1-4	-1 to 4
Grass clippings	-1	1-4	-1	1-4	--	1-4	-1 to 4
Motor oil	-3	-3	-3	--	1-4	1-4	-3 to 4
Phone books	1-4	-1	-1	--	1-4	1-4	-1 to 4
Cardboard	1-4	-1	-1	--	1-4	1-4	-1 to 4
Metal cans	1-4	-1	-1	--	1-4	1-4	-1 to 4
Leaves	-1	1-4	-1	1-4	--	1-4	-1 to 4
Light bulbs	-2	-2	-2	--	-1	1-4	-2 to 4
Glass jars	1-4	-1	-1	--	1-4	1-4	-1 to 4
Styrofoam	1-4	-1	-1	--	--	1-4	-1 to 4
Fine paper	1-4	-1	-1	--	1-4	1-4	-1 to 4
Magazines	1-4	-1	-1	--	--	1-4	-1 to 4
Aerosol can	-2	-2	-2	--	-1	1-4	-2 to 4

If all items are applicable:

TOTAL MAXIMUM SCORE 68
TOTAL MINIMUM SCORE -23